AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method for optimizing data to create one or more photolithographic masks, comprising:

receiving data that represents features to be created in a physical layer of an integrated circuit;

~~creating a number of data layers into which data structures that define regions of a mask can be grouped;~~

creating a number of data structures that represent regions of a mask and assigning each data structure to ~~one of the created data layers~~ a data layer in a layout database;

analyzing the data structures assigned to a data layer according to one or more design rules after the data structures have been created; and

fixing a property of each data structure in a data layer in accordance with the analysis performed.

2. (Currently amended) The method of Claim 1, wherein at least some of the data structures represent phase shifting areas on a mask, wherein the data structures that represent adjacent phase shifting areas on the mask are assigned to different data layers in the layout database.

3. (Original) The method of Claim 2, wherein the property that is fixed for each data structure that represents a phase shifting area is a phase shift amount, and wherein all data structures that represent phase shifting areas within a single data layer are assigned the same phase shift amount.

4. (Original) The method of Claim 3, wherein the phase shift amount requires that the mask be etched and the design rules minimize the area etched on the mask.

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5. (Original) The method of Claim 3, wherein the phase shift amount requires the application of additional transparent material on the mask, and the design rules minimize the amount of additional transparent material on the mask.

6. (Original) The method of Claim 1, wherein at least some of the data structures define areas on the mask that are covered by a partially transparent material and are assigned to a first data layer, and some of the data structures define areas on the mask that overlay an area of a partially transparent material with an opaque material and are assigned to a second data layer that is different from the first data layer.

7. (Original) The method of Claim 1, further comprising the step of: performing a lithographic simulation corresponding to the data structures with the properties assigned.

8. (Original) The method of Claim 7, further comprising the step of detecting errors in the lithographic simulation and reassigning one or more data structures to another data layer and re-analyzing the data structures in a data layer according to one or more design rules and refixing the properties of the data structures in the data layer in an iterative process to eliminate any errors.

9. (Original) The method of Claim 1, wherein the data structures are polygons.

10. (Original) The method of Claim 1, wherein the physical layer is a gate layer.

11. (Original) The method of Claim 1, wherein the physical layer is an interconnect layer.

12. (Currently amended) A method of optimizing data that define phase shifting areas on a photolithographic mask; comprising:

receiving data that describes features of a physical [[chip]] layer to be created on an integrated circuit;

~~creating a number of data layers;~~

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creating from the data a number of:

data structures that represent areas on the mask that will be opaque or non-opaque to create circuit elements; and

data structures that represent phase shifting regions on the masks, each data structure that represents a phase shifting region having a phase shift amount property;

assigning the data structures to [[the]] data layers in a layout database, such that data structures that represent adjacent phase shifting regions are assigned to different data layers;

analyzing the data structures assigned to a data layer in accordance with one or more design rules after the data structures have been created; and

assigning a common phase shift amount property for [[the]] all the data structures that represent phase shifting regions and are assigned to the same data layer in accordance with the analysis performed.

13. (Original) The method of Claim 12, wherein the phase shift amount property of the data structure represents a degree of etching on the mask, and wherein the one or more design rules minimize the etched area on the mask.

14. (Currently amended) A method for creating data used to produce one or more photolithographic masks, comprising:

receiving data that represents a layer [[in]] of a wafer to be created with the one or more photolithographic masks;

creating a number of data structures that represent phase shifting areas on the one or more photolithographic masks;

dividing the data structures that represent phase shifting areas into groups such that data structures that represent adjacent phase shifting regions are divided into different groups;

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analyzing the data structures that are commonly grouped with one or more design rules after the data structures have been created; and

assigning a property of each data structure that are commonly grouped in accordance with the analysis performed.

15. (Currently amended) The method of Claim 14, ~~further comprising creating one or more data layers and assigning~~ wherein the data structures that represent adjacent phase shifting areas are grouped into different data layers of a layout database wherein the analysis is performed on the data structures within a data layer and wherein each data structure [[with]] in a data layer is assigned the same property.

16. (Original) The method of Claim 15, wherein the property is a phase shift amount.

17. (Currently amended) A system for creating data used to produce one or more photolithographic masks, comprising:

a database on which is stored data that defines a number of layers of a wafer to be created with the one or more photolithographic masks;

a computer system that executes a sequence of programmed instructions to perform the acts of:

reading data from the database that ~~represents~~ defines a number of features to be created in a layer [[in]] of the wafer ~~to be created~~ with the one or more photolithographic masks;

creating a number of data structures that represent phase shifting areas on the one or more photolithographic masks;

grouping the data structures that represent phase shifting areas such that the data structures for adjacent phase shifting areas can be analyzed separately;

analyzing the commonly grouped data structures with one or more design rules after the data structures have been created;

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assigning a property of each commonly grouped data structure in accordance with the analysis performed.

18. (Currently amended) A computer readable media on which is stored a sequence of programmed instructions that when executed by a computer, cause it to perform the acts of:

receiving data that represents features in a layer [[in]] of a wafer to be created with the one or more photolithographic masks;

creating a number of data structures that represent phase shifting areas on the one or more photolithographic masks;

dividing the data structures that represent phase shifting areas into groups such that data structures that represent adjacent phase shifting regions are divided into different groups;

analyzing the data structures that are commonly grouped with one or more design rules after the data structures have been created; and

assigning a property of each data structure that is commonly grouped in accordance with the analysis performed.

19. (Currently amended) A system for producing one or more photolithographic masks, comprising:

means for storing data that defines one or more layers of a wafer to be created with the one or more photolithographic masks;

computer means for receiving the data and creating a number of data structures that represent areas on the one or more photolithographic masks at least some of which represent phase shifting areas, the computer means further dividing the data structures into groups analyzing the data structures that are commonly grouped according to one or more design rules after the data structures are created and assigning a phase shift amount to the commonly grouped data structures in accordance with the analysis performed.

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20. (Canceled)

21. (Currently amended) A photolithographic mask that is produced by:

receiving data that represents features in a layer [[in]] of a wafer to be created with the one or more photolithographic masks;

creating a number of data structures that represent phase shifting areas on the one or more photolithographic masks;

dividing the data structures into groups such that data representing adjacent phase shifting regions are in different groups;

analyzing the commonly grouped data structures with one or more design rules after the data structures have been created; and

assigning a common property of each of the commonly grouped data ~~structure~~ structures in accordance with the analysis performed.

22. (Canceled)

23. (New) The method of Claim 3, wherein the property that is fixed for each data structure that represents a phase-shifting area is 180 degrees.

24. (New) The method of Claim 3, wherein the property that is fixed for each data structure that represents a phase-shifting area is 270 degrees.

25. (New) The method of Claim 3, wherein the property that is fixed for each data structure that represents a phase-shifting area is 90 degrees.

26. (New) The method of Claim 2, wherein the property that is fixed for each data structure that represents a phase-shifting area is an amount by which the phase shifting region attenuates transmitted light.

27. (New) The method of Claim 16, wherein the phase shift amount is 180 degrees.

28. (New) The method of Claim 16, wherein the phase shift amount is 270 degrees.

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29. (New) The method of Claim 16, wherein the phase shift amount is 90 degrees.

30. (New) The method of Claim 15, wherein the property is an amount by which a phase shifting area attenuates transmitted light.

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